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Depression and protective factors of mental health in people with hepatitis C: A questionnaire survey

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ABSTRACT

Background: Most studies investigating the effects of chronic hepatitis C (HCV) infection on the central nervous system have focused on cognitive impairment or on the health-related quality of life, but only few on depression.
Objectives: This study investigated depression in HCV-infected people. Sense of coherence and social support were surveyed as protective factors of mental health.
Methods: In a cross-sectional study-design, 81 HCV-infected people with mild liver disease, who were not receiving antiviral therapy, were surveyed by validated measures. Anxiety (HADS), depression (BDI), psychopathological symptoms (SCL-90-R), social support (F-SozU) and resilience (SOC) were assessed.
Results: Higher levels of depression than normal controls ($p = .001$) and a wide range of psychological symptoms were associated with HCV infection. Women, single participants, and persons with a shorter interval after first diagnosis exhibited significantly higher scores of depression. Gender and sense of coherence predicted depression scores in HCV people ($R^2 = .42$, $p < .001$).
Conclusions: The expression of depression in HCV-infected people is modulated not only by biological but also by psychological factors of mental health. Sense of coherence as a protective factor has a significant impact on the degree of depression. Furthermore, the high prevalence of depression and anxiety among persons not receiving antiviral therapy justifies psychosocial screening and support for HCV people independent of antiviral therapy.

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What is already known about the topic?

- Depression in people with hepatitis C is biologically modulated.
- Depression is a common finding among people with HCV under interferon therapy.

What this paper adds

- There is a high prevalence of depression and anxiety in people with HCV not receiving antiviral therapy.
- Psychological factors like resilience modulate the expression and degree of depression in HCV-infected people.
- This justifies psychosocial screening and support for people with HCV independent of antiviral therapy.

1. Introduction

Chronic hepatitis C (HCV) is a major cause of chronic liver disease affecting approximately 150 million individuals worldwide (Schreier and Höhne, 2007; Sweeting et al., 2007). There is strong evidence for a mild but significant cognitive impairment in HCV infection (Forton

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et al., 2002a, 2006). Furthermore it is well established in the literature that HCV infection reduces the quality of life and that interferon treatment of HCV is accompanied with numerous side effects including depression. However, depression is also a common finding among people not receiving antiviral therapy (Forton et al., 2002b). While most studies focused on the impact of HCV infection on health-related quality of life (Spiegel et al., 2005; Strauss and Dias Teixeira, 2006), there are only few studies, which focused on depression in HCV-infected people (Dwight et al., 2000; Fontana et al., 2002; Goulding et al., 2001).

1.1. Hepatitis C, quality of life and depression

Chronic liver disease and HCV infection reduce health-related quality of life independent of the stage of liver disease (Marchesini et al., 2001; Younossi et al., 2001). Furthermore, the decrease in quality of life is determined by psychiatric and medical comorbidities and disease-related worries (Dwight et al., 2000). Recent studies of health-related quality of life (Häuser et al., 2004; Sherman et al., 2004; Spiegel et al., 2005) showed that in comparison to healthy controls, the impact of HCV was most relevant in social and physical functioning, general health, and vitality. People with hepatitis C infection complain of "mental clouding" as impaired concentration, fatigue, and depression (Huet et al., 2000; Gifford et al., 2005; McAndrews et al., 2005). Significant neurocognitive impairment of attention, concentration and information processing speed has been established in several studies (Forton et al., 2005, 2006).

Different lines of evidence hint at an association between depression and HCV infection: the depression caused by the stress of having a potentially life-threatening illness; the stigmatizing nature of the diagnosis, and the high proportion of persons at risk for psychiatric disorder in cohorts of HCV-infected people (Singh et al., 1997; Johnson et al., 1998; Kraus et al., 2000; Fontana et al., 2002). In cross-sectional studies, depression scores were elevated for HCV-positive people and did not differ significantly for drug users or the remaining people (Bell et al., 1990; Fingerhood et al., 1993; Woodfield et al., 1994; Fisher et al., 1997; Zdilar et al., 2000). Prior research has also established evidence of a direct organic pathway of depression induced by HCV and recent studies have given evidence for alterations of serotonergic and dopaminergic neurotransmission in HCV-infected people with chronic fatigue and cognitive impairment (Cozzi et al., 2006; Weissenborn et al., 2006).

Since we assumed that depressive symptoms in people with HCV depend not only on biological but also on psychosocial factors, the objective of this study was to investigate the impact of protective factors.

1.2. Protective factors of mental health

Resilience means the individual's capacity to cope with stressors such as disease or trauma. It also indicates the psychological ability to cope with negative events as a protective factor of mental health (Schnyder et al., 1999; Suominen et al., 2001; Eriksson and Lindstrom, 2006).

Sense of coherence, the central psychological construct of Antonovsky's theory of salutogenesis (Antonovsky, 1979) is one of the most surveyed factors of resilience (Feldt et al., 2007; Surtees et al., 2006). An individual with a strong sense of coherence has the ability to define life events as less stressful (comprehensibility), to mobilize resources to deal with encountered stressors (manageability), and to possess the motivation, desire and commitment to cope (meaningfulness) (Antonovsky, 1979). Another protective factor for mental health is social support (Haggerty, 1980; Cohen and Wills, 1985): social support is an effective buffering factor when people are under distress (Uchino et al., 1996) and has a positive influence on the immune, neuroendocrine, and cardiovascular systems (Steptoe, 2000). The positive impact of social support on coping and health behavior has been verified for patients with chronic illness such as multiple sclerosis (Aronson, 1997), coronary heart disease (Van Puymbroeck and Rittman, 2005), and transplant patients (Goetzmann et al., 2005).

1.3. Objectives

The goal of this study was to research depression and other psychopathological symptoms in HCV-infected people and to analyze how sense of coherence and social support influence them.

We assumed that depression and psychopathological symptoms in people with HCV differ from the norm population in the mean value of the questionnaires with a small effect size of $d = 0.3$ (Cohen, 1992). Further we hypothesized that higher levels of sense of coherence and social support would be related to lower levels of anxiety and depression, and that sense of coherence and social support would predict the latter variables.

2. Method

2.1. Study population

2.1.1. Inclusion criteria

A total of 81 people with HCV of the hepatitis outpatient unit at the University Hospital, all given their written informed consent, were included in the study. Data were collected on an anonymous basis to avoid persons' apprehensions concerning treatment admission.

2.1.2. Exclusion criteria

People with cirrhosis, undergoing interferon therapy, with co-infections such as hepatitis B or human immunodeficiency virus, were excluded.

The participants were asked when they were examined routinely in the hepatitis outpatient unit. With a small effect size ($d = 0.3$), a significance level of $\alpha = 0.05$ and a power of $1 - \beta = 0.8$, a sample size of $N = 64$ is required to test the hypotheses (Power 3.0.10). Altogether 130 people with hepatitis C were included in the study, 84 participants completed the questionnaires, which lead to rate response rate of 65%. Three persons were excluded from the analyses

because of missing data, so the sample consists of 81 HCV-infected people.

2.2. Measures

2.2.1. Beck Depression Inventory (BDI) (Beck and Steer, 1987; Hautzinger et al., 1994)

The BDI is one of the most widely applied instruments to measure the severity of depression. It contains 21 items related to depression symptoms such as hopelessness and irritability, cognitions such as guilt or feelings of being punished, as well as physical symptoms such as fatigue, weight loss, and lack of interest in sex, which are summed up to a total score. The validity and reliability are considered to be excellent. The normative control group for the validation of BDI consisted of mentally and physically healthy persons ($n = 86$), 37.2% of whom were males and 62.8% females with a mean age of 55 years (SD = 16.1). The mean value for depression was $M = 6.45$ (SD = 5.2) in this group.

2.2.2. Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith, 1983; Herrmann et al., 1995)

The HADS is an internationally widely used screening instrument to assess anxiety and depression in physically ill. It consists of 14 items, 7 related to anxiety and 7 items to the depression subscale, which are added up to an anxiety and depression score respectively. Scores of 7 are considered to be normal, 8–10 as borderline, and scores of 11 and more indicate clinical cases. The validity and reliability for health settings as well as among the general population have been confirmed by previous studies. The normative control group for the validation of HADS consisted of participants without health problems ($n = 152$), 38% of whom were males and 62% females. Mean age was 42 years (SD = 15.4), mean value for anxiety $M = 5.8$ (SD = 3.2) and for depression $M = 3.4$ (SD = 2.6) in the control group. This questionnaire was applied because it measures only mental and not physical symptoms of depression, reducing the influence of other conditions.

2.2.3. Symptom Check List (SCL-90-R) (Derogatis, 1986; Franke, 1995)

Psychological strain was assessed using the German Version of the Symptom Check List 90 Items (revised) as published by Franke (1995). The SCL-90-R contains 90 items that are summed up in global scores or in the subscales of somatization, obsessive-compulsive behavior, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. According to the manual, the cut-off value for highly affected patients was set at >8. Reliability, validity and psychometric properties have been established for the SCL-90-R (Franke, 1995).

2.2.4. Social Support Questionnaire (F-SOZU) (Fydrich et al., 1987)

This questionnaire is a widely used German self-report questionnaire with 54 items for the assessment of social support in four major scales (“emotional support”, “instrumental support”, “social integration”, and “social strain”) and a global scale. It records individual experiences regarding socially supportive relationships, problematic support, as well as the anticipated social support. Reliability (Cronbach’s alpha between .81 and .93) and validity were tested in different samples and German norm values are available (Fydrich et al., 1999).

2.2.5. Sense of Coherence Scale (SOC) (Antonovsky, 1987; Schumacher et al., 2000)

The sense of coherence scale SOC consists of 29 seven-point Likert-type items, measuring the subscales comprehensibility, manageability, and meaningfulness: the higher the total score of the SOC, the stronger the sense of coherence. Validity and reliability have been confirmed in previous studies (Antonovsky, 1993), German norm values are available (Schumacher et al., 2000). Since the overall scale values have been found to be more reliable and valid than subscale scores (Frenz et al., 1993; Schnyder et al., 1999) only the overall scale of SOC was included in our calculations.

2.3. Statistical analyses

Data were registered and analyzed using the Statistical Package for Social Sciences, version 13.0 (SPSS Inc., Chicago, IL). For descriptive analysis, data were expressed as mean values and standard deviations. To analyze the bivariate relationships between the dependent (anxiety, depression and symptom strain) and independent variables (sense of coherence and social support), Pearson correlations were conducted. For tests of significance, mean differences of continuous variables among subgroups were conducted by analysis of variance (ANOVA procedure, followed by Scheffé test) and t-test for independent samples (comparison of two subgroups). Comparisons between the sample and norm values were performed using one-sample t-tests. A series of multiple hierarchical regression analyses was calculated to quantify the relative contribution of sense of coherence and social support in prediction of the criterion variables to detect predictors for mental stability. For all tests, significance was determined at a 2-tailed p value ≤ 0.05.

3. Results

3.1. Demographics

Demographics are depicted in Table 1. Fifty-one persons (63%) were male; the mean age was $M = 47.1$ (SD = 11.9) years. Participants were infected with HCV on average $M = 7.38$ years (SD = 6.04).

The self-reported mode of acquisition included 8 persons (9.9%) infected through former drug abuse, 32 (39.5%) infected through transfusion or other medical treatment, 2 persons (2.5%) infected through sexual contact; for 27 (33.3%) the cause of infection was unknown, and 12 persons (14.8%) reported other modes of acquisition (e.g. working as a nurse, medical assistant, laboratory nurse). A group of 21 (25.9%) persons reported to have previous experience with psychiatric treatment, 49.4% ($N = 40$) reported suffering from another medical illness.

Table 1
Demographics.

	HCV patients ($N = 81$)
Age (years; $M \pm SD$; range)	47.1 ± 11.9 (20–68)
Gender	
Male	51 63%
Female	30 37%
Family status	
Single	25 30.9%
Married	44 54.3%
Separated/divorced	8 9.9%
Widowed	1 1.2%
Unknown	3 3.7%
Nationality	
German	75 92.6%
Spanish	1 1.2%
Polish	1 1.2%
French	1 1.2%
British	1 1.2%
Unknown	2 2.5%
Education	
Without certificate	2 2.5%
In school	8 9.9%
Public school	32 39.5%
High school	16 19.7%
University qualification	23 28.4%
Employment status	
Employed	39 48.1%
Unemployed	9 11.1%
Housewife/student	23 28.4%
Retired	7 8.6%
Unknown	3 3.8%

3.2. Former interferon treatment

A total of 40 (49.4%) persons had received interferon therapy in the past; 12 (30%) persons reported having terminated interferon therapy prematurely because of side effects. There were no significant differences with regard to depression scores between people with previous interferon therapy and the interferon-naïve individuals ($t = -.56$; $p = .57$), or people who had terminated their HCV-therapy because of side effects compared to the remaining people ($z = -1.21$; $p = .23$).

3.3. Outcome measures

HADS-D: Mean value for depression was $M = 5.41$ ($SD = 4.4$) and for anxiety $M = 7.17$ ($SD = 4.0$) measured with HADS, i.e. these people exhibited significantly higher scores for depression ($t = 4.08$; $p < 0.001$) with an effect size of $d = 0.6$ and anxiety ($t = 3.06$; $p = 0.003$; $d = 0.3$) than a healthy sample. Compared to a cohort of psychiatric patients, HCV-infected people scored significantly lower on depression ($t = -5.26$; $p < 0.001$) and anxiety ($t = -8.08$; $p < 0.001$) (Fig. 1).

According to the cut-off values of HADS regarding depression, 59 people (72.8%) were assessed as normal, 10 persons (12.3%) had borderline scores, and 12 participants (14.8%) reached clinically relevant scores. Concerning anxiety, 52 persons (64.2%) were assessed as normal, 10 (12.3%) reached borderline scores and 19 (23.5%) clinically relevant scores. The evaluation of sociodemographic variables showed no significant correlation between age, gender, family status, or employment and the HADS depression and anxiety scores.

BDI: Measured with BDI, mean value for depression was $M = 10.1$ ($SD = 9.7$) and significantly higher in comparison to a normative sample ($t = 3.32$; $p = 0.001$) with an effect size of $d = 0.5$ (Fig. 1). The cut-off scores for BDI yielded following groups: 36 persons (44.4%) are indicated as not depressive, 9 (11.1%) had a mild/moderate depression, and 18 persons (22.2%) exhibited a moderate up to severe depression. The BDI-scores did not differ regarding employment ($F = .73$; $p = 0.54$) status, but women demonstrated significantly higher scores than men ($t = 2.27$; $p = 0.026$) and an ANOVA yielded significant differences with regard to family status ($F = 2.42$; $p = 0.045$). Participants who were single had higher depression values ($p = 0.05$) compared to married persons.

A Pearson correlation revealed that the time interval since initial diagnosis was correlated with depression scores ($t = -0.25$; $p = 0.03$). In people with a recently diagnosed hepatitis C, mean scores for depression and anxiety ($t = -2.52$; $p = 0.014$) were significantly higher (HADS: $t = -2.72$; $p = 0.009$; BDI: $t = -2.09$; $p = 0.04$) than in the subgroup of people who had known of their infection for more than 5 years.

3.3.1. General Symptom Stress (SCL-90)

General distress because of psychiatric symptoms as measured with SCL-90 (GSI: $M = 0.58$; $SD = 0.56$) was significantly higher ($t = 4.11$; $p < 0.001$) than in the German normative sample with an effect size of $d = 0.6$. For depression ($t = 3.96$; $p < 0.001$) and anxiety ($t = 2.91$; $p = 0.005$) and also for the following subscales of SCL-90, people with HCV scored higher than the normative sample: somatization ($t = 4.50$; $p < 0.001$), compulsiveness ($t = 3.34$; $p = 0.001$), insecurity in social contact ($t = 2.99$; $p = 0.004$), aggression/hostility ($t = 1.98$; $p = .05$), phobic anxiety ($t = 2.66$; $p = .01$), psychoticism ($t = 3.00$; $p = 0.004$). In comparison with a cohort of psychiatric patients, HCV-infected people scored significantly lower in these subscales ($p < 0.001$) (Fig. 1).

3.3.2. Sense of coherence (SOC)

Scores for sense of coherence ($M = 4.95$; $SD = 0.9$) were similar to those of a normative sample ($M = 5.0$; $SD = 0.89$) ($t = -1.55$; $p = 0.13$). Effects of age ($r = .10$; $p = .38$) or gender ($t = -1.30$; $p = .20$) could not be found.

3.3.3. Social support (F-SozU)

In social support, people with HCV scored ($M = 4.31$; $SD = 0.58$) significantly higher ($t = 6.33$; $p < .001$) than the norm. No age ($r = .17$; $p = .13$) and gender ($t = -1.92$; $p = .06$) effects could be found.

3.4. Correlational analysis

Sense of coherence was negatively linked to the occurrence of depressive symptoms (measured with BDI and HADS) as well as anxiety and general symptom strain (SCL-90). Sense of coherence was also correlated to social support. The correlation-matrix is depicted in Table 2.

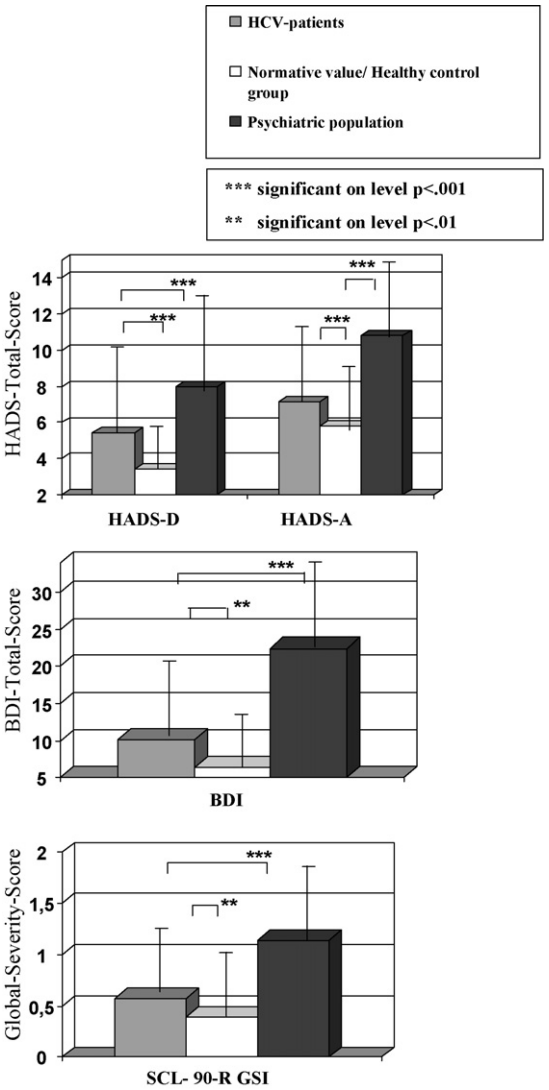

Fig. 1. Group comparisons of depression, anxiety and general distress symptoms in HCV-infected patients, normative control groups and patients with psychiatric disorders.

3.5. Multiple hierarchical regression analysis

3.5.1. Prediction of depression

Age, gender, time interval since initial diagnosis, level of education, sense of coherence, and social support as potential predictors of depression were included in a hierarchical multiple regression model. Sense of coherence as a significant independent variable explained 22% of the variance in depression scores according to HADS. A second multiple regression analysis using BDI depression scores as the criterion variable and the above mentioned covariates as possible predictors explained 42% of the variance with sense of coherence and gender as significant predictors of depression scores (Table 3).

4. Discussion

In this survey, depressive symptoms in HCV-infected people not receiving interferon therapy were measured with three independent measures. All measures have indicated higher depression scores in the HCV population compared to normal or healthy controls. BDI, in contrast to HADS, identified a larger group of people with a clinically relevant depression; this may be due to the fact that this measure also included items concerning somatic symptoms of depression, i.e. psychomotor retardation, fatigue, loss of appetite or weight, which are difficult to differentiate from bodily symptoms of liver disease. These findings are in accordance with Golden et al. (2007), who reported higher agreement of BDI than HADS-scores with the DSM–IV diagnosis of depression. BDI also revealed higher depression scores in women than in men; in previous studies, a higher prevalence of depression in females with HCV awaiting interferon therapy has also been reported (Golden et al., 2005). Participants who were single had higher depression levels, a fact which may be ascribed to the well-known protective effects of partnership (Scherer et al., 2007). Our sample, which is not representative for the hepatitis C population, shows a large group who acquired the virus through blood transfusion and a small group of former IV drug users in comparison than has been reported previously (Kraus et al., 2000). However, there is no evidence that there is a difference between depression scores in former IV drug users and non-IV drug users. Several groups could show that the mode of acquisition did not have a significant impact on emotional status and depression in HCV-infected groups (Goulding et al., 2001, Kraus et al., 2000).

In contrast to previous research that revealed higher psychological distress in people with a longer time interval since diagnosis, depression scores were significantly higher in people with a recently diagnosed hepatitis C in our sample (Kraus et al., 2000). Furthermore, a recently diagnosed hepatitis C in contrast to persons who had known their infection for more than 5 years is associated with a higher level of anxiety and depression. This may be due to the diagnosis shock, the initial difficulties to cope

Table 2
Correlation-matrix.

	Sense of coherence (SOC)	Social support (F-SozU)	Depression (BDI)	Depression (HADS)
Social support	0.43**			
Depression (BDI)	−0.58**	−0.38**		
Depression (HADS)	−0.39**	−0.29**	0.64**	
Anxiety	−0.38**	−0.25*	0.57**	0.79**

Sense of coherence and social support were negatively linked to the occurrence of depressive symptoms (measured with BDI and HADS) as well as anxiety.
* Correlation is significant on a 0.05 level.
** Correlation is significant on a 0.01 level.

Table 3
Regression analyses.

Dependent variable	Significant predictors	Beta	*t*	*p*
Depression (BDI) ($R^2 = 0.42$)[a]	1. Sense of coherence	−0.599	−7.73	.000
	2. Gender	0.175	2.26	.026
Depression (HADS) ($R^2 = 0.22$)[a]	1. Sense of coherence	−0.472	−5.54	.000

Independent variables in each regression model: age, gender, time interval since initial diagnosis, education, sense of coherence, social support; R^2: coefficient of determination.
[a] Explained variance of the model.

with chronic illness (Blake-Mortimer et al., 1999). The persons who are faced with the diagnosis of a life-threatening disease are confronted with their own mortality and experience their lives as interrupted. High psychological distress in our sample was also demonstrated by previous experiences with psychiatric and psychopharmacological treatment.

Nearly half of the sample reported former interferon therapy and 30% of these premature termination of interferon because of side effects. Depression has been regarded as a major risk factor for compliance problems in antiviral therapy of hepatitis C (Kraus et al., 2000; Zdilar et al., 2000), and may have effected terminations of therapy in the past. However, at the time of our measurement, people reporting therapy drop-out scored similarly on depression compared to the remaining people.

According to the SCL-90-R, people with HCV scored higher than the normative sample not only for depression and anxiety but also for somatization, compulsiveness, insecurity in social contacts, aggression/hostility, phobic anxiety, and psychoticism. Similarly, Fontana et al. (2002) reported elevated levels of somatization, anxiety, depression, psychoticism, and compulsiveness as measured with the BSI, a short form of the SCL-90-R. Somatization is putatively a result of focusing attention on the bodily symptoms; insecurity in social contacts may be a reaction to experiences of stigmatization. In our clinical experience aggression and hostility are often reported by the persons themselves or by their spouses. Dan et al. (2007) demonstrated anger experiences among HCV-infected people undergoing antiviral therapy. Anger, aggression or hostility may be relevant symptoms of organic affective disorders as in the case of HCV- or interferon-induced emotional disorders.

Our results show that hepatitis C-related emotional distress does not only include depression, but a wide array of psychological symptoms. This finding may have some consequences for the pre-treatment assessment of people with HCV who are to be educated about disease-related symptoms of psychological distress; only in this way they can differentiate between normal alterations of emotional well-being and disease-related disturbances and can thus decide whether psychotherapeutic or psychopharmacologic support is needed.

In accordance with our expectations, persons with hepatitis C perceived higher social support than is the case for the normal population: individuals suffering from a physical illness receive equal or higher levels of social support from their environment than healthy controls (Archonti et al., 2004; Erim et al., 2006).

Sense of coherence is looked upon as a mediator variable between stressful life events and the expression of emotional symptoms such as depression and anxiety (Schnyder et al., 1999). High sense of coherence is linked to good psychological coping with disease-related distress. Sense of coherence is a trait variable and relatively constant over time; no reduction is expected in a sample without primary mental health problems. Sense of coherence scores were similar to those of a normative sample and therefore in accordance with our expectations. Confirming our hypotheses concerning the moderating effects of sense of coherence, correlation analyses revealed negative correlations between the same variable and depression.

In a regression analysis gender and sense of coherence together predicted clinically relevant depression. Beyond the organic causes of depression, psychological and personality aspects contribute to the expression of distress symptoms and depression. This can be seen in the framework of the general stress-diathesis theory that predicts symptom expression in individuals with poor mental stability when biological or social stressors arise (Zubin and Spring, 1977). The assessment of these psychological factors can therefore supplement the decision making process of commencing antiviral therapy.

An advantage of the resilience perspective is that it is applicable to all patients with or without known psychiatric disturbances. When they are affected of chronic illness, people with low sense of coherence will have a minor capacity to understand internal and external impulses (comprehensibility), and will not be able to discern a challenge in being chronically ill (meaningfulness). They will need accurate education about the disease and the treatment method to cope up with the demands of the external world (manageability). Therefore they will need more trust and security, more reassurance from the nursing personnel to cope up with their internal stimuli, in this case anxiety and depressive thoughts. Professional helpers may be more demanded in the care of patients with low resilience. References to concepts such as self-resilience, a wish for trust and security, and the need for reassurance, are not pejorative and do not burden the patient–professional relationship. On the other hand, to know that the relationship to a special ill person is difficult, because of his subjective problems, and not because of ones' own defenselessness can relieve professionals from unnecessary emotional involvement.

4.1. Limitations

Since data were selected anonymously, the analyses of the impact of HCV load and HCV genotype on depression

scores were not possible. Furthermore, we did not conduct a clinical interview with the persons that would allow the association of self-rating scores and clinical diagnosis of depression to be investigated.

4.2. Conclusions

Health professionals are for the most part informed about the interferon-induced depression, but the peoples' elevated psychological distress independent of interferon is often overlooked. The most important finding of this study is that people with HCV also exhibit raised depression scores and general symptoms of emotional distress when they are not receiving interferon therapy. Sense of coherence and gender has been identified as significant predictors of depression in hepatitis c infected people. We conclude that the individual protective resources of the people with HCV in coping with disease are crucial and should be taken in the decisions regarding treatment of HCV-infected people. In addition, psychosocial assessment is indicated in people with hepatitis C independent of antiviral therapy. To evaluate the impact of resilience versus biological factors in the expression and the degree of depression, future studies should include biological markers of the hepatitis c infection and measures of depression.

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